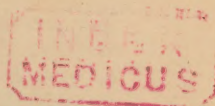


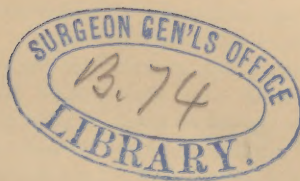
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with the compliments of
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FILARIA IN THE EYE.

BY CHAS. S. TURNBULL, M.D., PH.D.



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SURGEON TO THE EYE AND EAR DEPARTMENT OF THE HOWARD AND THE GERMAN HOSPITALS, PHILA.

A PAPER

Read before, and Published by Request of, the Alumni Society of the Auxiliary Department of the University of Pennsylvania, at its Stated Meeting, Sept. 27th, 1878.

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Filaria in the Eye of the Horse.

Hearing, through the kindness of a friend, that there was on exhibition, at a stable on Sansom street, a horse with a living worm in his eye, I at once made search for the curiosity. After finding and making a critical examination of the case, I was convinced that it was one of more than usual interest. At my desire Prof. Joseph Leidy visited the animal with me, and as he had never seen such a case before, he expressed himself emphatically concerning its novelty and interesting nature.

As all physicians are more or less interested in horses, I have described the case mentioned, as well as two others, both of which occurred in this country, have visited some of our most prominent veterinary surgeons, and consulted the best authorities on helminthology and hippo-physiology, so as to be able to present a reliable and succinct account of the disease in question.

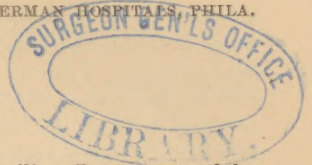
A heavily built dun horse, twelve years of age, which had been raised and worked upon a farm near Rochester, N. Y., was led out to the light, and through the partially opaque cornea of his left eye could be seen a worm, several inches in length. It was white in color, and without the aid of any artificial means could be distinctly seen floating, wriggling and twisting about in the anterior chamber. The eye seemed very much irritated, as the horse continually endeavored to rub it, and the stimulus of light caused profuse lachrymation, and, what is char-

acteristic in such cases, *at times only*, was the cornea hazy, and the aqueous humor cloudy. The horse appeared perfectly healthy, was in excellent condition, and did not seem to be particularly annoyed by the presence of his unusual guest. The iris was of a good color, the action of the pupil perfect, lens clear, and remainder of the eye free from irritation.

The horse had been turned out early last spring (which will be remembered as an unusually wet one), and about that time the worm, which was one inch in length, was first discovered. Since then it has grown several inches, and at the time of this writing looks like a piece of catgut from four to five inches in length. On account of its incessant motion no details concerning the parasite's exact shape could be made out. As the present owner bought the horse for his eye, no one will be likely to have that satisfaction.

This case makes the *third*, which so far as I can ascertain, has occurred in this country. The *first* on record was exhibited in this city in the latter part of the last century, and was reported by the late Judge Francis Hopkinson, in a paper read before the Philosophical Society, September 26th 1783.* He says, "This worm was of a clear white color, in size and appearance much like a piece of white bobbin. It seemed to be from two and a half to three inches in length. The creature was in constant

* *Trans. Am. Philos. Soc.*, 1st Series, Vol. II.



lively vermicular motion, sometimes retiring so deeply into the eye as not to be seen at all. I could not distinguish its head, neither end being perfectly exhibited while I viewed it; and, indeed, its motion was so brisk and constant as not to admit of so nice an examination. The horse's eye was exceedingly inflamed, swollen and running, so that it was with difficulty the eye could be kept open for more than a few seconds at a time, and I was obliged to watch favorable moments for a distinct view of the tormentor. I believe (the Judge goes on to say) the horse was quite blind in that eye, for it appeared as if all the humors were confounded together, and that the worm had the whole orb to range in."

This worm, I think, must also have been in the anterior chamber, for if the eye had been in the disorganized condition represented by the Judge, the parasite could not have been seen at all.

The second case, which was never reported, occurred in the practice of Dr. Th. N. Corbyn, PH. D., V. S., of this city, who kindly gave me the following interesting account of it. "I have had but one case in an experience extending over fifty years, and this occurred in the year 1833. The horse, the property of a physician in Alleghany City, Pa., had periodic attacks of ophthalmia. After the inflammation had subsided, I discovered the parasite floating in the aqueous humor. It was about two inches long. The case created quite a sensation at the time. I operated by penetrating the cornea, making the opening above; the humor spurted out, and with it came the worm, which looked like a fine piece of catgut. I prescribed low diet, with aperient medicine, and kept the eye covered, so as to exclude light. In fifteen days the eye recovered entirely."

In searching the literature of this subject, the accompanying cuts, taken from Müller's *Zoologica Danica*, vol. 3, p. 49, t. 109, f. 12, were chosen as best exhibiting the characteristics of the parasite under consideration.*

Fig. 1 represents the *Filaria papillosa Rudolphi*, natural size.

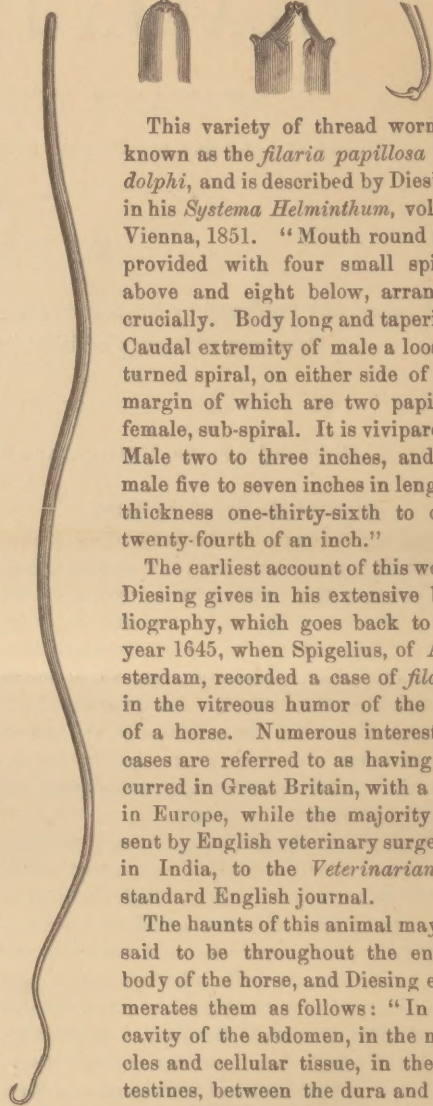
Fig. 2, the head, magnified.

Fig. 3 again shows the magnified head with the papilla squeezed out.

* For those who are anxious to look up the minute anatomy of this worm, I would recommend "Gurlt's Pathological Anatomy of the Horse," and Leuckart's "Menschlichen Parasiten."

Fig. 4. Magnified caudal extremity, supposed to be of a male.

FIG. 1. FIG. 2. FIG. 3. FIG. 4.



This variety of thread worm is known as the *filaria papillosa Rudolphi*, and is described by Diesing, in his *Systema Helminthum*, vol. II., Vienna, 1851. "Mouth round and provided with four small spines above and eight below, arranged crucially. Body long and tapering. Caudal extremity of male a loosely turned spiral, on either side of the margin of which are two papilla; female, sub-spiral. It is viviparous. Male two to three inches, and female five to seven inches in length; thickness one-thirty-sixth to one-twenty-fourth of an inch."

The earliest account of this worm Diesing gives in his extensive bibliography, which goes back to the year 1645, when Spigelius, of Amsterdam, recorded a case of *filaria* in the vitreous humor of the eye of a horse. Numerous interesting cases are referred to as having occurred in Great Britain, with a few in Europe, while the majority are sent by English veterinary surgeons in India, to the *Veterinarian*, a standard English journal.

The haunts of this animal may be said to be throughout the entire body of the horse, and Diesing enumerates them as follows: "In the cavity of the abdomen, in the muscles and cellular tissue, in the intestines, between the dura and pia mater (Abildgaard), in the vitreous body (Spigelius), in the anterior chamber (Hopkinson, Morgan, Greve and many others), and still more rarely between the coats of the eye. In the ass and mule, in the abdomen and thorax (Gurlt). In the domestic cattle, in the abdomen, rarely in the anterior chamber (Chaignaut and Gurlt)."

Diesing says that he saw such a *filaria*, and for hours observed it, in the anterior chamber of

the eye of a horse. It was several inches long and very white, and in continual lively movement like a serpent.—Veterinary School in Vienna.

Mr. Twining, a resident at Poonah, in India, for sixteen years averaged twenty cases annually, more than fell to the lot of any other individual in Hindostan. The worm or worms, for there are sometimes two or three floating in the aqueous humor at the same time, by their presence, cause symptoms of ophthalmia, with great intolerance of light. The worm, he says, is a species of filaria or thread worm, called *filaria equi*.

Sir Everard Home informs us that (*filaria equi*) are found in the circulating blood of the horse, and it is supposed to be transmitted through that medium. Worms have been found in the coeliac artery of the ass, but of greater magnitude. Naturalists have discovered numerous genera and several species—the *ascaris*, *tænia*, *filaria*, *strongula*, *ligula*, etc.—as inhabitants of the body of the horse, sheep, ox, hog, deer, etc.

The most succinct account of this phenomenon is by Sir Chas. Percivall, v.s., in 1825, and published in the London *Veterinarian*, for 1828. He says, "in low, humid situations in India, where frogs are prevalent, or where there is stagnant water, especially after an unusually wet season, worm in the eye is a very common occurrence. It is also seen in other parts during the cold months, from the beginning of October to the latter part of February, and especially during the continuance of an east wind. The symptoms are those of a conjunctivitis; the cornea is obscured by a 'nebulous effusion,' the eyelids are closed, and there is intolerance of light.

"On close inspection a small, white worm can be discerned floating in the aqueous humor, at one time rising to the superior, at another sinking to the inferior portion of the anterior chamber.

"The method of treatment is by puncturing the cornea at its upper and inner margin, and allowing the parasite to escape with the aqueous humor. This spot is selected for the operation because the cornea is here least dense, and because the aqueous humor, which gradually reforms, will be least likely again to escape while the wound is healing.

"These worms find their way into the animal's body along with the water he drinks, either as fully developed parasites, or as ova. Both the

parasites and eggs are found in the stagnant waters of India."

The *Veterinarian* for 1864, p. 218, contains the account of a case where this species of worm was removed by the operation just described, one from either eye. Beer's cataract knife was used to make the incision. The *Edinburgh Veterinary Review*, vol. 6, for 1864, also contains a very interesting and humorous account of a similar case.

A fact of intense satisfaction to the lovers of horsemesh is, that in no case of operation for the removal of filaria has the function of the eye been more than temporarily disturbed.

Since commencing this paper I have learned, through a friend, that Dr. Chas. J. Kipp, of Newark, N. J., exhibited, at a recent meeting of the New York Ophthalmological Society, a fine specimen of filaria which he had removed from the anterior chamber of the eye of a horse. The Doctor will doubtless publish a detailed account of the case.

Filaria in the Eye of Man.

Although it seems a shocking thing to contemplate, it is, nevertheless, true, that filaria, and living ones, too, have been found in the human eye.

Dr. Nordmann,* of Odessa, describes the circumstances which led him to discover the existence of entozoa in the eyes of several vertebrates; and he gives a minute account of them, illustrated by beautiful figures, representing their form and internal structure. His researches, during the years 1830 and 1831, embraced numerous eyes of horned cattle, sheep, pigs, frogs, lizards and fishes, with some from the human subject, and birds. He found entozoa of the genus *filaria* in the human eye, in that of the haddock (*gadus aeglefinus*), of the genus *ascaris* in the frog, of the genus *oxyuris* in the perch, of the genus *cysticercus* in the pig, and *trematoda* in great abundance in fishes generally. In fishes he first found entozoa in the vitreous humor, but he subsequently met with them in the crystalline lens and the capsule, between the laminae of the cornea, in the iris and retina and in the aqueous humor (*Lib. cit.* pp. 1-6). In the crystalline lens of some fishes they are so numerous as to render it more or less opaque, and thus to impair or injure sight. (*Lib. cit.* pp. 19, 20.)

* Nordmann, "Mikrographische Beiträge zur Naturgeschichte der Wirbellosen Thiere, Erstes Heft," pp. 11-13.

A species of filaria (*filaria medinensis*?) has been seen under the conjunctiva oculi, in the West Indies. Schön has quoted some facts of this kind. A case was related to him by Dr. Gaertner, who resided in the West Indies, and considered it to be the guinea worm.*

Dr. Thos. G. Morton, of this city, has given an interesting account of a filaria ("Dracunculus, or *Filaria loa*) removed by a native woman from beneath the conjunctiva of the eyeball of a negress at Gaboon, West Africa, with a brief history of the parasite, and Professor Leidy's description of the specimen."†

Cobbold says, "these worms are identical with those described by Gayot as dwelling beneath the conjunctiva of negroes at Congo, and the Gaboon region generally."‡ Davaine has reported several similar cases, and refers to them as *La filairie de l'orbite* §

The *filaria lentis* (Cobbold), and what is identical, the *filaria oculi humani* (Nordmann), was discovered by the last named investigator, in the year 1831.|| Dr. Nordmann examined two lenticular cataracts taken from an elderly man, half an hour after they had been extracted by Prof. von Graefe. In one of these, which was partially surrounded by the capsule, he observed in the Morgagnian fluid two very small and delicate rings, which he clearly recognized under the microscope as convoluted filariæ. One of the two had been injured in the middle, so that the intestines had come out of the body, and were visible as slender threads. The other was uninjured, of uniform thickness, three-quarters of a line long, and extremely narrow. It was spirally convoluted and dead. A simple intestinal canal, a mouth with visible papillæ, a uterus, and a prominent anal aperture could be distinguished (*Lib Cit*, pp. 7, 8).

In 1832 he was present at two operations of extraction, performed on old women, by Prof. Jüngken, and found a living filaria, five lines and a half long, in the act of casting its skin (in der häutung begriffene), in the lens of the first patient (a case of green, lenticular cataract); no living extraneous body was found

in the other lens. The second case was more interesting, as it presented the first example of microscopical entozoa, possessing suckers (*Trematoda Rudolphi*), being found in the human eye; eight individuals of the genus *monostroma* were found in the substance of the lens. These minute beings were situated in the upper strata of the crystalline; they were one-tenth of a line long, and moved sluggishly when placed in warm water. The examination took place immediately after the operation. In neither case was the opacity complete, and the lenticular substance was soft. (*Lib. cit. Zweite Heft. Vorwort*, p. 9.)

M. Davaine also mentions a comparatively recent case of filaria in the anterior chamber of the eye, but full particulars do not appear to be published. The case previously cited is by Sichel,* from whom we gather that the specimen was brought forward by Quadri, of Naples. The living worm was in the vitreous humor of a woman, thirty years of age. The function of the eye was perfectly normal. The latter authority exhibited the parasite *in situ* at a meeting of the Ophthalmological Congress held at Brussels.

Von Ammon found a filaria in a lenticular cataract, of which the nucleus was firm and the exterior pulpy. The cataract was extracted. He has figured the animal, of its natural size and magnified.†

Then, again, there is the case observed by Gescheidt,‡ in which Von Ammon operated for congenital cataract. In this case there were four filariæ, of the genus *distoma*. The largest measured one-sixth, the smallest one-fifteenth, of an inch.§

Cobbold considers them embryonic *nematodes*, which have accidentally or otherwise selected the human body as their intermediary host.

Mauthner|| says he saw what he supposed to be a dead filaria floating about in the perfectly clear vitreous humor of a man forty years of age.

Von Wecker, the author of the second half of the fourth volume of "Graefe and Saemisch's

* Handbuch der Pathologischen Anatomie des Menschlichen Auges, pp. 226, 227.

† American Journal of the Medical Sciences, Phila., July, 1877.

‡ Entozoa, London, 1864, p. 388.

§ Davaine, Traité des Entozoaires, Paris, 1860, p. 750.

|| Nordmann, Mic. Beiträge z. Nat. d. Wirb. Thiere.

* Iconographie Ophthalmologique, p. 707; also Zander, Der Augenspiegel, 2 Auflage, p. 190.

† Klinische Darstellung, Pt 1, vol. XII, Fig. 23 and 23.

‡ Zeitschrift für die Ophthalmologie, "III Bandes, IV Heft., p. 405; Die Entozoa des Auges, u.s.w.

§ Zeitschrift für die Ophthalmologie, vol III pp. 75, 76.

|| M. Optischen Fehler des Auges, 1872.

Augenheilkunde," gives no new cases, but mentions a case of supposed *filaria spiralis* (?) which he considered a rudimentary persistent hyaloid artery.

The presence of *filaria* within the human eye is, beyond a doubt, of rare occurrence, no instances on record are of recent date, and our more modern text books and works on ophthalmology either omit them altogether or else refer but briefly to the few cases herein mentioned.

Having occurred once, *filaria* will doubtless be found again, and if there exists a "*filaria sanguinis hominis*," as Drs. T. R. Lewis, of India, Bancroft, of Australia, and especially Dr. Manson,* of China, have pointed out, we must look for it wherever the blood circulates.

* In a paper entitled "Report of Hæmatozoa," Patk. Manson, M.D., of Amoy, China, says—"1. That a large ratio of the population of this province, and probably of other parts of China, is infested with the *filaria sanguinis hominis*. The exact ratio

Seldom is it that the oculist in his busy round stops to scrutinize the cataractous lens he so dexterously extracts, or to examine in minute detail every floating opacity in the vitreous body, and I must confess I am of the opinion that it behooves us to be more on the lookout for the phenomena in question.

(The writer of this paper will be exceedingly indebted for any reliable account of a worm or worms in the human eye.)

cannot yet be stated, but if my observations are a fair guide, one in thirteen is near it. 2. That the *filaria sanguinis hominis* may be present in the blood, and yet the hosts be in good health and exhibit no morbid phenomena. 3. That in the same persons it may be present at one time and absent at another. 4. That at one time or another it is generally associated with *elephantoid disease*, and is almost certainly connected with the causes of such affections. 5. That it is sometimes associated with a diseased condition characterized by frequently recurring attacks of fever, accompanied by general anasarca, unconnected with heart or kidney disease.

